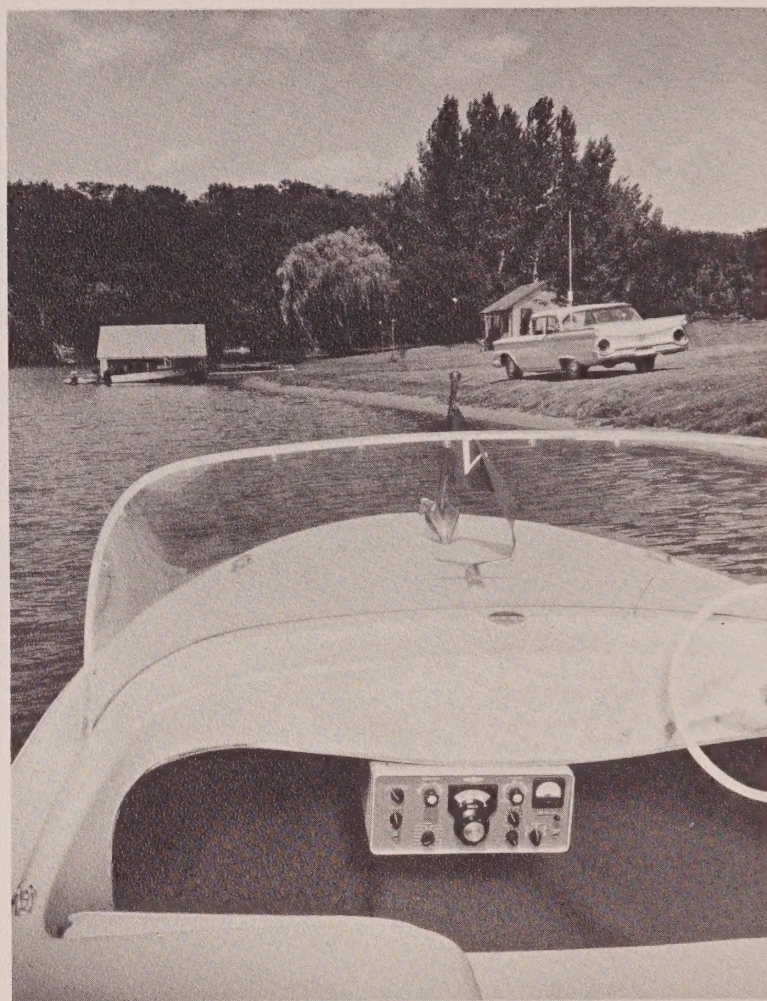


COLLINS **KWM²**



● mobile or fixed station SSB transceiver

Wherever the Collins KWM-2 Transceiver is installed, the amateur is provided with excellent communication on 80-10 meters.



THE COLLINS KWM-2 TRANSCEIVER reflects the modern concept of style, mobility and versatility in single sideband amateur radio systems. Distinctive modern styling and easy mobility make the lightweight KWM-2 an attractive unit for the car, boat, passenger station in an airplane or fixed station.

Featuring operation on all bands between 3.4 mc and 29.7 mc on either voice or CW, the KWM-2 has the quality and performance of the time-proven KWM-1 and famous Collins S/Line.

Filter type SSB generation and crystal-controlled double conversion also are features of the KWM-2, in addition to VOX and speaker anti-trip circuits, ALC, permeability-tuned oscillator and RF inverse feedback for excellent linearity. ALC keeps the signal adjusted to its rated PEP resulting in an increased average talk power. All tuned circuits and several tubes function in the dual role of transmitting and receiving. Components common to both transmitter and receiver are the oscillators, Mechanical Filter and RF amplifier. Both transmitter and receiver low frequency IF amplifiers are 455 kc, and the high frequency IF amplifiers, which will accommodate a full 200 kc bandwidth, are 2.955-3.155 mc.

The KWM-2 is easily moved between mobile and fixed station installations. For mobile use, the transceiver slides into the mount and the power, antenna, antenna selector and car radio speaker plugs connect automatically. These same four connectors are used in a fixed station installation.

Fixed station units that may be added for greater KWM-2 versatility are the 30S-1 Linear Amplifier, 312B-5 PTO Console, 516F-2 AC Power Supply and SC-301 Antenna Control Console. The KWM-2 RF power input is 175 watts PEP on SSB, or 160 watts on CW. Although the KWM-2 provides ample RF power for excellent communication, it can be used without modification to excite the Collins 30S-1 Linear Amplifier, which increases the power to the full legal limit on SSB and 1 kw on CW. The 312B-5 PTO Console, with an external PTO and tuning dial, provides three combinations of frequency control and unites the KWM-2 and associated equipment into a fixed station system.

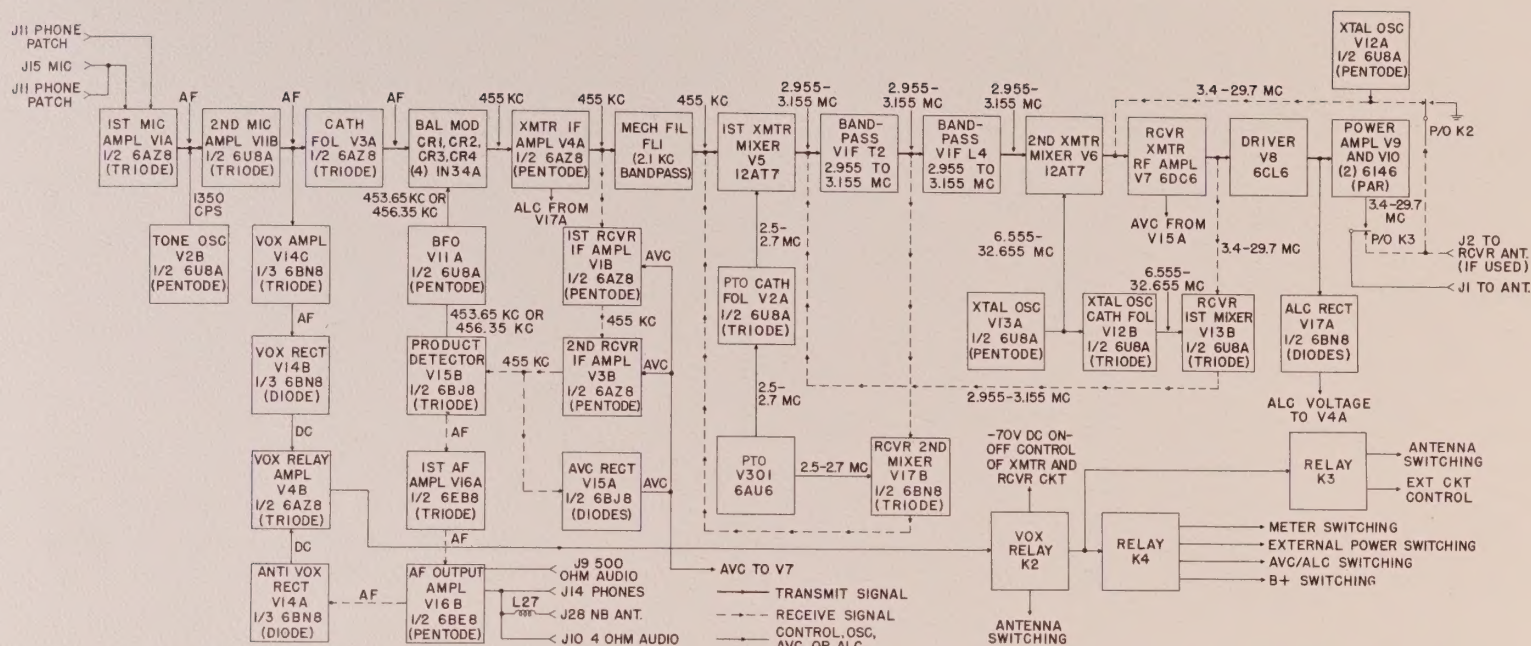
The KWM-2 mobile transceiver transmits on voice or CW with a nominal output of 100 watts for complete coverage on 80 through 10 meters. Any

of the fourteen 200 kc segments of the 3.4-30.0 mc frequency range may be used except the 5.0-6.5 mc range on transmitting. Other frequencies (such as MARS) outside the amateur bands may be obtained by removing amateur band crystals and inserting the proper injection oscillator crystals. Receiver sensitivity and gain may be slightly reduced at frequencies which are considerably removed from the amateur bands.

Crystal sockets, crystals and band switch positions are provided for twelve 200 kc bands, with the standard amateur configuration equipped as follows: 3.4-3.6, 3.6-3.8, 3.8-4.0; 7.0-7.2, 7.2-7.4; 14.0-14.2, 14.2-14.4, 14.8-15.0; 21.0-21.2, 21.2-21.4, 21.4-21.6; 28.5-28.7. Crystal sockets and band switch positions are provided for two additional 200 kc bands between 28 mc and 30 mc.

An integrated Collins amateur radio system built around the KWM-2 Transceiver. Shown are the 516F-2 AC Power Supply with SC-301 Antenna Control Console, KWM-2, 312B-5 PTO Console and 30S-1 Linear Amplifier. The four units are easily arranged for complete and convenient station operation.





KWM-2 BLOCK DIAGRAM

The chassis, cabinet and panel are constructed of aluminum, and the cabinet wrap-around is perforated for ventilation. The color of the cabinet is light gray, semi-gloss enamel, with dark gray leatherette-type front panel. Access to tubes and maintenance adjustments is through a hinged top cover. Jacks for connection of power supplies and auxiliary equipment are at the rear of the cabinet. Band change switching for use in antenna selection is brought out through an accessory plug.

transmitting function

The audio input passes to a balanced modulator, which has 455 kc output containing both upper and lower sidebands. The signal is applied to the first transmitter mixer through a 2.1 kc band-pass Mechanical Filter. The proper sideband is chosen by the emission switch, which selects either the 453.65 or 456.35 kc BFO crystal for upper or lower sideband. In the first balanced mixer the PTO frequency is cancelled and the 455 kc SSB signal is translated to 2.955-3.155 mc. The signal from the variable IF amplifier is applied to one of the grids of the second balanced mixer, and the high frequency injection signal from the crystal oscillator is fed to the cathode and other grid. This cancels the HF injection signal within the mixer and translates the IF frequency to the desired band. VOX circuits automatically switch the unit from

receive to transmit whenever the operator speaks into the microphone. An anti-trip circuit permits VOX operation with loud speaker volume. ALC voltage is obtained from the PA grid and applied to the IF and RF grids. Output from the RF amplifier is coupled through a pi network and K3 relay to the antenna.

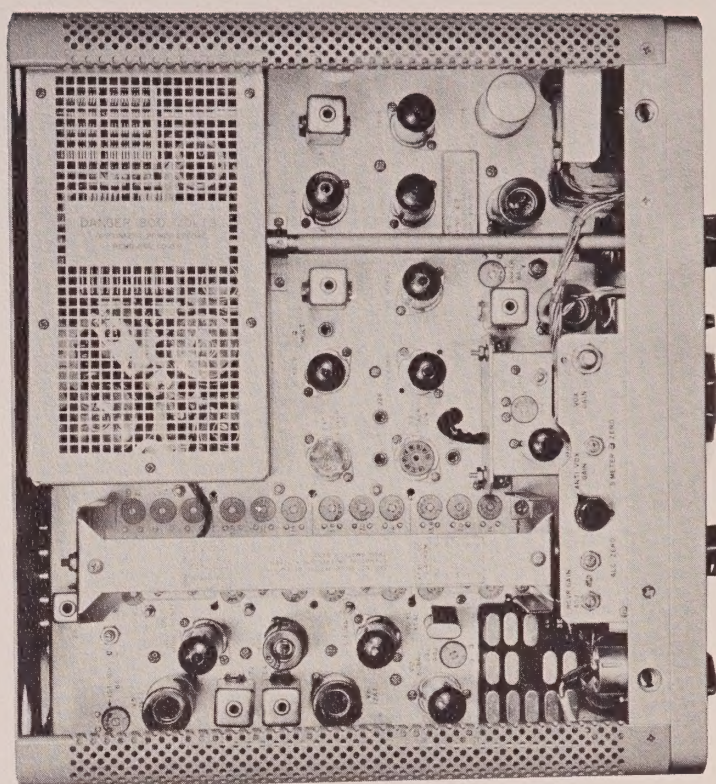
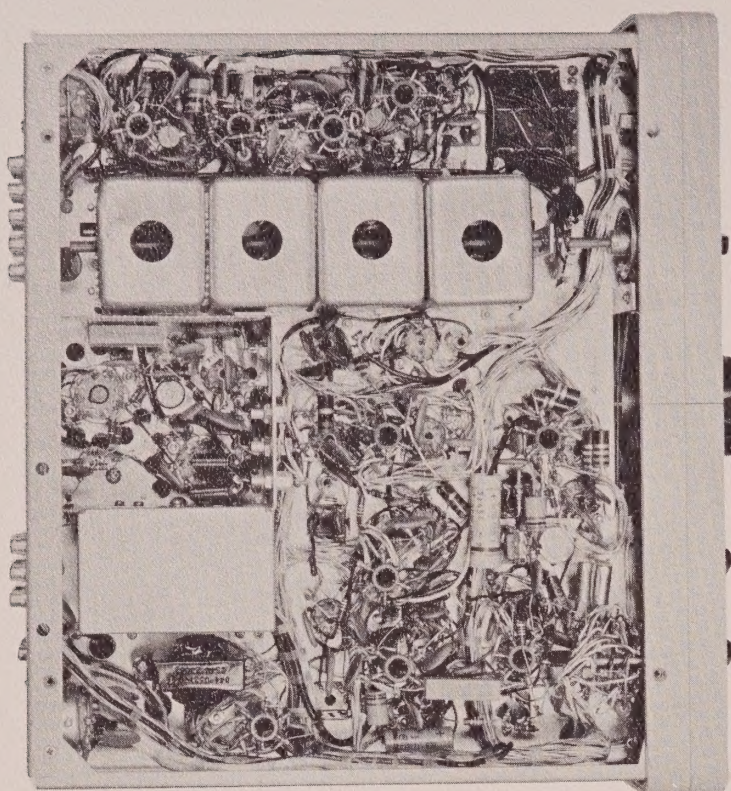
receiving function

In receive operation, the incoming signal passes through the transmit-receive antenna relay and RF amplifier to the first receiver mixer. The difference product of the mixer is applied to the 2.955-3.155 mc variable IF and then to the second receiver mixer. A trap circuit minimizes spurious that might result from harmonics of the HF oscillator. The 455 kc difference frequency from the second mixer passes through a Mechanical Filter to receiver IF amplifiers and a product detector. Detection action is obtained by applying a BFO signal to the cathode, and the product of mixing is the detected audio signal. Rectified AVC voltage is applied to the receiver IF amplifiers to control the receiver gain and prevent overloading. An amplifier raises the audio to a suitable level to operate the speaker, headphones or phone patch circuit. A self-contained 100 kc crystal calibrator, which may be adjusted to zero beat with WWV or other frequency standard, permits exact calibration.



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SPECIFICATIONS

FREQUENCY RANGE: 3.5, 7.0, 14.0, 21.0 and 28.0 mc amateur bands plus 14.8-15.0 mc band for WWV. Choice of any fourteen 200 kc bands by crystal switch. Easily retuned to frequencies between amateur bands by replacing amateur band crystals with crystals selected for the frequencies desired.

TYPES OF EMISSION: SSB — upper or lower sideband. CW — keyed tone.

RF POWER INPUT: 175 watts SSB PEP or 160 watts CW.

POWER INPUT: CW — key closed, 320 watts ac, 25 amps at 12 v. Voice average — 255 watts ac, 20 amps at 12 v. Voice — no modulation 230 watts ac, 15 amps at 12 v. Receive — 150 watts ac, 10 amps at 12 v.

POWER SOURCE: 275 v dc, 0.200 amps; 800 v dc, 0.250 amps; bias adjustable between —60 and —80 v. In addition the following heater requirements, depending upon power supply used, are: 6.3 v ac, 10.6 amps; 12 v dc, 5.3 amps; 24-28 dc, 2.65 amps.

POWER OUTPUT: Nominal 100 watts PEP into a 50 ohm load.

OUTPUT IMPEDANCE: 50 ohms with not more than 2:1 SWR.

SIZE: Transceiver — 7¾" H, 14¾" W, 13¼" D.

WEIGHT: Transceiver — 18 lbs., 3 oz.

OSCILLATORS: A double conversion circuit is used with CR-18 crystals in the HF oscillator. A PTO, tuning 2.5-2.7 mc, provides 200 kc bands. A crystal oscillator operating at either 453.650 kc or 456.350 kc provides carrier for SSB generator and choice of upper or lower sideband. The tone oscillator operates at about 1350 cps. Its output is fed to the transmitter audio circuits for tune-up signal and CW. A 100 kc crystal calibrator may be trimmed to zero beat with WWV.

FREQUENCY STABILITY: Over-all stability due to temperature, humidity, pressure and voltage — 750 cps. Dial accuracy 1 kc throughout range.

HARMONIC & SPURIOUS RADIATION: Carrier suppression —40 db; unwanted sideband —50 db; oscillator and mixer products —50 db

except crossover at 3500 kc —40 db; second harmonic —50 db. third order distortion —30 db.

KEYING CHARACTERISTICS: Keying, free of chirps and clicks, up to 40 wpm. Break-in CW and sidetone provided.

MODULATION CHARACTERISTICS: Modulation capabilities of 100 watts PEP output on SSB.

AUDIO INPUT: High impedance microphone, 600 ohm or high impedance phone patch.

AUDIO FREQUENCY RESPONSE (Over-all): Nominal 300-2400 cps ± 6 db.

AUDIO COMPRESSION CHARACTERISTICS: ALC operates on IF and RF amplifier stages and capable of 10 db of compression.

AUTOMATIC GAIN CONTROL: The audio output level does not change more than 20 db as the input signal is changed from 5 uv to 1 v. Fast attack and slow release provide excellent AVC action on voice and CW.

RF FEEDBACK: About 10 db of RF feedback around PA and driver for improved PA linearity.

NOISE LEVEL: —40 db below single tone carrier.

CONTROLS: Band Selector, PTO Dial, Emission Switch (Tune Lock, LSB, USB, CW), Exciter Tune, PA Tune, PA Load, Microphone Gain (Mic OFF switch on control), Meter Switch (ALC, PA Grid, PA Plate), OFF, ON, NB, CAL Switch, AF Gain, RF Gain, VOX Gain and Anti-VOX Gain.

INDICATING DEVICES: Panel meter used as S-meter on receive and tuning meter on transmit.

AMBIENT TEMPERATURE RANGE: 0° — 50° C.

AMBIENT HUMIDITY RANGE: To 90%.

VIBRATION: 2 g at 10-33 cps.

ALTITUDE: To 10,000 ft.

RECEIVER SENSITIVITY: 0.5 uv for 10 db S/N ratio within amateur bands.

RECEIVER SELECTIVITY: Nominal 2.1 kc determined by Mechanical Filter.

RECEIVER INPUT CIRCUIT: 50 ohm unbalanced.

RECEIVER OUTPUT CIRCUIT: 4 ohm voice coil, 500 ohm and phone jack.

ACCESSORIES

516E-1 DC POWER SUPPLY operates from 12 v dc. Provides all voltages for the KWM-2 for mobile operation. Uses six power transistors as switching elements and thereby eliminates vibrators and rotating machinery. The 516E-2 is used for 24-28 v dc operation. **SIZE:** 5 $\frac{3}{4}$ " H, 11 $\frac{3}{8}$ " W, 7 $\frac{3}{4}$ " D. **WEIGHT:** 12 $\frac{1}{2}$ lbs.

351D-2 MOBILE MOUNT facilitates mounting the KWM-2 on the transmission hump under an automobile dashboard, providing slide-in installation of the transceiver. The bracket arms fold flat on base plate when not in use.

351E-4 MOUNTING TRAY of anodized aluminum fastens to table top or deck and has two snap-in clamps for secure installation of KWM-2 in a boat, passenger station in an airplane, etc.

516F-2 AC POWER SUPPLY operates from 115 v ac, 50-60 cps. Provides all voltages for the KWM-2. **SIZE:** 7 $\frac{3}{4}$ " H, 10" W, 12" D. **WEIGHT:** 28 lbs.

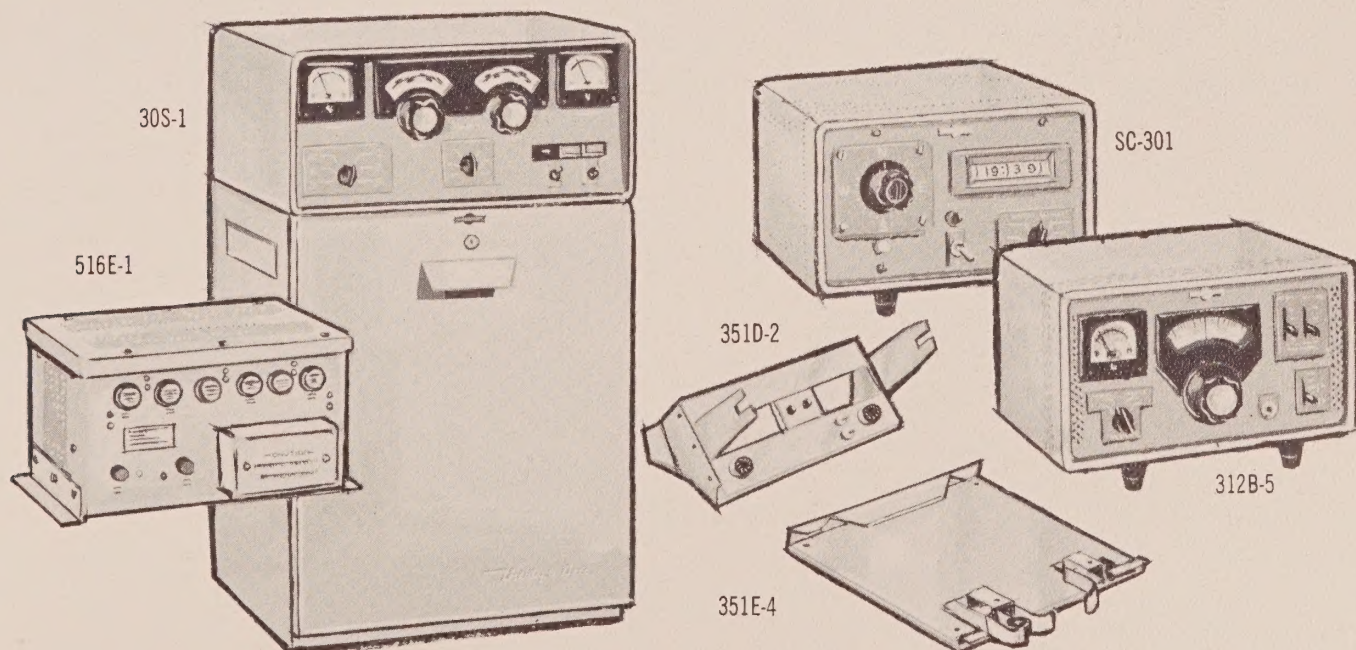
SC-301 ANTENNA CONTROL CONSOLE mounts a 24-hour clock, antenna selector switch, beam direction indicator, direction switch and relay power supply. Replaces dummy panel of 516F-2 Power Supply. Supplied without direction indicator and switch.

312B-5 PTO CONSOLE combines the KWM-2 and accessories into a fixed station operating system. The tuning dial and PTO on the 312B-5 provide for the following combinations of frequency control: transceive on the KWM-2 PTO; transceive on the

312B-5 PTO; receive on the KWM-2 PTO and transmit on the 312B-5 PTO. The **FUNCTION** switch provides for **NORMAL** station operation, and **TRANSMIT ONLY** disables the receiver and operates the transmitter **VOX**. The 399C-1 PTO Speaker provides all the frequency control flexibility of the 312B-5 but does not have the directional watt meter and phone patch. The 312B-4 Speaker Console is similar to the 312B-5 except for the external tuning dial and PTO. **SIZE:** 7 $\frac{3}{4}$ " H, 10" W, 12 $\frac{1}{4}$ " D. **WEIGHT:** 8 $\frac{1}{2}$ lbs.

30S-1 LINEAR AMPLIFIER is a self-contained, single tube, grounded grid linear amplifier. Requiring 70-100 watts driving power, it provides the full legal power input for SSB (1 kw average) or 1 kw input for CW. Front panel switching makes available two different power levels for SSB operation: 100 watts from the exciter alone or the full 1 kw meter average input for SSB. The 30S-1 is provided with RF inverse feedback for excellent linearity. ALC voltage from the amplifier is fed back to the KWM-2 Transceiver. The power supply for the 30S-1 is housed in the lower portion of the cabinet and provides cathode bias voltage and 3000 v for the 4CX1000A plate. **SIZE:** 30 $\frac{5}{8}$ " H, 17" W, 16 $\frac{5}{8}$ " D. **WEIGHT:** 160 lbs.

136B-2 NOISE BLANKER may be installed in the KWM-2 to effectively eliminate impulse interference from ignition systems, electric motors, household appliances, etc. The 136B-2 differs from simple audio clipping circuits or series type limiters by silencing ahead of the selective sideband filters.



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